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ABSTRACT

This brochure presents current knowledge and theories regarding the causes and treatment of dyslexia. Psychological, biological and educational factors thought to contribute to dyslexia are outlined, as are common approaches to treatment and long-term prospects for individuals with dyslexia. Efforts by the National Institute of Child Health and Human Development to support research into causes and treatment of dyslexia are also described. Five other sources of information are listed. (PB)

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FACTS
ABOUT

Dyslexia

ED 368 092

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Developmental dyslexia is a specific learning disability characterized by difficulty in learning to read. Some dyslexics also may have difficulty learning to write, to spell, and, sometimes, to speak or to work with numbers. We do not know for sure what causes dyslexia, but we do know that it affects children who are physically and emotionally healthy, academically capable, and who come from good home environments. In fact, many dyslexics have the advantages of excellent schools, high mental ability, and parents who are well-educated and value learning.

School children are subject to a broad range of reading problems and researchers have discovered the causes of many problems. Today, most teachers accept these research findings and use them in planning their instruction, but there remains a small group of children who have difficulty in learning to read for no apparent reason. These children are called dyslexic. Although estimates of the prevalence of dyslexia are hard to find, some researchers estimate that as many as 15 percent of American students may be classified as dyslexic.

Defining Dyslexia

Over the years, the term dyslexia has been given a variety of definitions, and for this reason, many teachers have resisted using the term at all. Instead, they have used such terms as "reading disability" or "learning disability" to describe conditions more correctly designated as dyslexia. Although there is no universally recognized definition of dyslexia, the one presented by the World Federation of Neurology has won broad respect: "A disorder manifested by difficulty in learning to read despite conventional instruction, adequate intelligence and sociocultural opportunity."

Symptoms

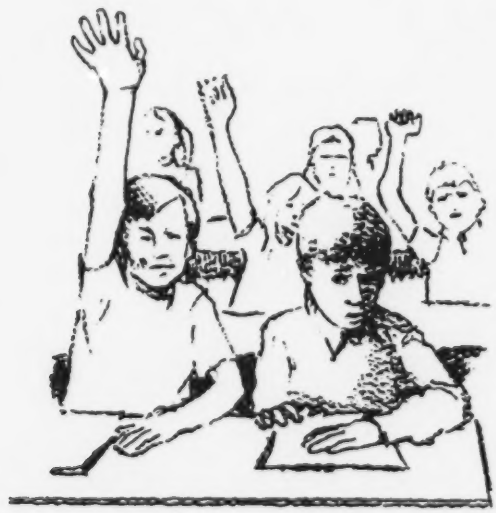
Children with dyslexia are not all alike. The only trait they share is that they read at levels significanly lower than is typical for children of their age and intelligence. This reading lag usually is described in terms of grade level. For example, a fourth grader who is reading at a second grade level is said to be two years behind in reading. (Such a child

may or may not be dyslexic; there are many nondyslexic children who experience problems in reading.)

Referring to grade level as a measure of reading is convenient but it can be misleading. A student who has a two-year lag when he is in fourth grade has a much more serious problem than a tenth grader with a two-year lag. The fourth grader has learned few of the reading skills which have been taught in the early grades, while the tenth grader, by this measure, has mastered eight years or 80 percent of the skills needed to be a successful reader.

Samuel T. Orton, a neurologist who became interested in the problems of learning to read in the 1920s, was one of the first scientific investigators of dyslexia. In his work with students in Iowa and New York, he found that dyslexics commonly have one or more of the following problems:

- difficulty in learning and remembering printed words;
- letter reversal (b for d, p for q) and number reversals (6 for 9) and changed order of letters in words (tar for rat, quite for quiet) or numbers (12 for 21);
- leaving out or inserting words while reading;
- confusing vowel sounds or substituting one consonant for another;
- persistent spelling errors;
- difficulty in writing.



Orton noted that many dyslexics are lefthanded or ambidextrous and that they often have trouble telling left from right. Other symptoms he observed include: (a) delayed or inadequate speech; (b) trouble with picking the right word to fit the meaning desired when speaking; (c) problems with direction (up and down) and time (before and after, yesterday and tomorrow); and (d) clumsiness, awkwardness in using hands, and illegible handwriting. Orton also found that more boys than girls show these symptoms and that dyslexia often runs in families. Fortunately, most dyslexics have only a few of these problems, but the presence of even one is sufficient to create unique educational needs.

Possible Causes

When researchers first began searching for the cause of dyslexia, they looked for one factor as the exclusive source of the problem. Now most experts agree that a number of factors probably work in combination to produce the disorder. Possible causes of dyslexia may be grouped under three broad categories: educational, psychological, and biological.

Educational Causes

Teaching Methods: Some experts believe that dyslexia is caused by the methods used to teach reading. In particular, they blame the whole-word (look-say) method that teaches children to recognize words as units rather than by sounding out letters. These experts think that the phonetic method, which teaches children the names of letters and their sounds first, provides a better foundation for reading. They claim that the child who learns to read by the phonetic method will be able to learn new words easily and to recognize words in print that are unfamiliar as well as to spell words in written form after hearing them pronounced. Other reading authorities believe that combining the whole-word and the phonetic approaches is the most effective way to teach reading. Using this method children memorize many words as units, but they also learn to apply phonetic rules to new words.

Whatever method they support, experts who think that instructional practices may cause dyslexia agree that strengthening the beginning reading programs in all schools would significantly decrease the number and the severity of reading problems among school children.

Nature of the English Language: Many common English words do not follow phonetic principles, and learning to read and to spell these words can be difficult, especially for the dyslexic. Words such as cough, was, where, and laugh are typical of those words that must be memorized since they cannot be sounded out. While such words undoubtedly contribute to reading problems, they constitute only a small percent of words in English and so cannot be considered a primary cause of dyslexia.

Intelligence Tests: The commonly accepted definition of dyslexia as a reading disability affecting children of normal

intelligence is based on the assumption that we can measure intelligence with a fair degree of accuracy. Intelligence test results, usually referred to as IQ scores, must be interpreted carefully. IQ scores may be affected by factors other than intelligence. Those IQ tests which require the child to read or write extensively pose special problems for the dyslexic. Scores from such tests may reflect poor language skills rather than actual intelligence. Even those IQ tests that are individually administered and demand little or no reading and writing may fail to give a fair measure of intelligence; dyslexics often develop negative attitudes toward all testing situations. In addition, conditions such as noise, fatigue, or events immediately preceding the testing session may adversely affect test results. With such a range of possible influences on IQ scores, we must regard these scores as, at best, an estimate of the range of the child's scholastic aptitude, and at worst, a meaningless number that can unjustly label the student.

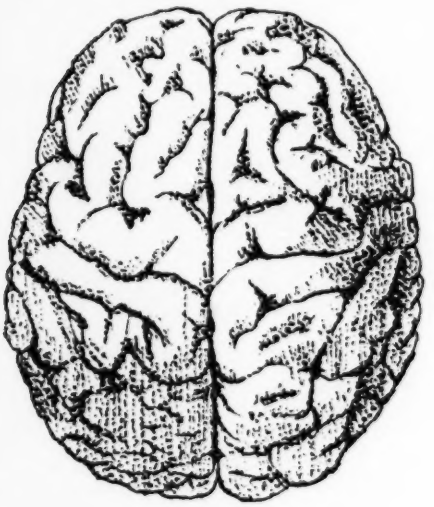
Psychological Causes

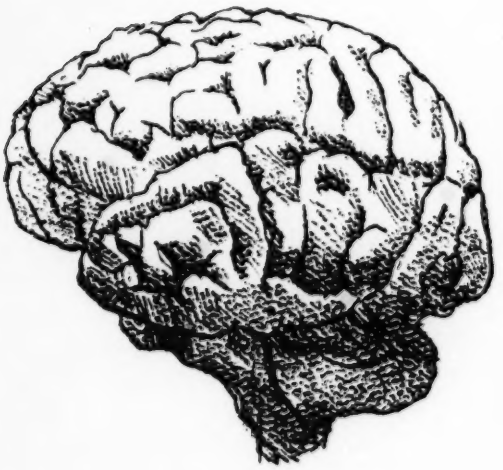
Some researchers attribute dyslexia to psychological or emotional disturbances resulting from inconsistent discipline, absence of a parent, frequent change of schools, poor relationships with teachers or other causes. Obviously a child who is unhappy, angry, or disappointed with his or her relations with parents or other children may have trouble learning. Sometimes such a child is labelled lazy or stupid by parents and friends—even by teachers and doctors. Emotional problems may result from rather than cause reading problems. Although emotional stress may not produce dyslexia, stress can aggravate any learning problem. Any effective method of treatment must deal with the emotional scars of dyslexia.

Biological Causes

A number of investigators believe that dyslexia results from alterations in the function of specific parts of the brain.

They claim that certain brain areas in dyslexic children develop more slowly than is the case for normal children, and that dyslexia results from a simple lag in brain matura-





tion. Others consider the high rate of lefthandedness in dyslexics as an indication of differences in brain function. This theory has been widely debated, but recent evidence indicates that it may have some validity. Another theory is that dyslexia is caused by disorders in the structure of the brain. Few researchers accepted this theory until very recently when brains of dyslexics began to be subjected to post-mortem examination. These examinations have revealed characteristic disorders of brain development. It now seems likely that structure disorders may account for a significant number of cases of severe dyslexia.

Genetics probably play a role as well. Some studies have found that 50 percent or more of affected children come from families with histories of dyslexia or related disorders. The fact that more boys than girls are affected means that nongenetic biological factors as well as environmental/sociological factors could contribute to the problem.

Treatment

Educators and psychologists generally agree that the remedial focus should be on the specific learning problems of dyslexic children. Therefore, the usual treatment approach is to modify teaching methods and the educational environment. Just as no two children with dyslexia are exactly alike, the teaching methods used are likewise varied.

Children suspected of being dyslexic should be tested by trained educational specialists or psychologists. By using a variety of tests, the examiners are able to identify the types of mistakes the child commonly makes. The examiner is then able to diagnose the problem and if the child is dyslexic, make specific recommendations for treatment such as tutoring, summer school, speech therapy, or placement in special classes. The examiner may also recommend specific remedial approaches. Since no method is equally effective for all children, remediation should be individually designed for each child. The child's educational strengths and weaknesses, estimated scholastic aptitude (IQ), behavior patterns, and learning style, along with the suspected causes of the dyslexia, should all be considered when developing a treatment plan. The plan should spell out those skills the child is expected to master in a specific time period, and it should describe the

methods and materials that will be used to help the child achieve those goals.

Treatment programs for dyslexic children fall into three general categories: developmental, corrective, and remedial. Some programs combine elements from more than one category.

The *developmental* approach is sometimes described as a "more of the same" approach: Teachers use the methods that have been previously used believing that these methods are sound, but that the child needs extra time and attention. Small-group or tutorial sessions in which the teacher can work on reading with each child allow for individual attention. Some researchers and educators believe, however, that this method is not effective for many children.

The *corrective* reading approach also uses small groups in tutorial sessions, but it emphasizes the child's assets and interests. Those who use this method hope to encourage children to rely on their own special abilities to overcome their difficulties.

The third approach, called *remedial*, was developed primarily to deal with shortcomings of the first two methods. Proponents of this method try to resolve the specific edu-

cational and psychological problems that interfere with learning. The instructor recognizes a child's assets but directs teaching mainly at the child's deficiencies. Remedial teachers consider it essential to determine the skills that are the most difficult and then to apply individualized techniques in a structured, sequential way to remedy deficits in those skills. Material is organized logically and reflects the nature of the English language. Many educators advocate a multisensory approach, involving all of the child's senses to reinforce learning: Listening to the way a letter or word sounds; seeing the way a letter or word looks; and feeling the movement of hand or mouth muscles in producing a spoken or written letter, word or sound.

Prognosis

For dyslexic children, the prognosis is mixed. The disability affects such a range of children and presents such a diversity of symptoms and such degrees of severity that predictions are hard to make.

Parents of dyslexic children may be told such things as "the child will read when he is ready" or "she'll soon outgrow it." Comments like these fail to recognize the seriousness of the problem. Recent research shows that dyslexia does not go away, that it is not outgrown and that extra doses of traditional teaching have little impact.

Fortunately, educators are becoming more aware of the complexities of dyslexia, placing greater emphasis on choosing the most appropriate teaching method for each child. Teachers are more willing to provide remedial teaching over longer periods of time, whereas prior practice often has been to cut off services if observable changes fail to occur in a limited time. Some dyslexics improve quickly, others make steady but very slow progress, and still others are highly resistant to instruction. Many have persistent spelling problems. Some acquire a basic reading skill but cannot read fluently.

A child's ability to conquer dyslexia depends on many things. An appropriate remedial program is critical. However, environmental and social conditions can undermine any treatment program. The child's relationships with family, peers, and teachers have a major effect on the outcome of instruction. In a supportive atmosphere, a child's

chance of success is enhanced. Attitudes such as "expectancy," the degree to which a teacher expects a child to learn, are important. Children who sense that they are not expected to succeed seldom do. Since slight progress in reading ability can make an enormous difference in academic success and vocational pursuits, children need to know that they are expected to progress.

The earlier dyslexia is diagnosed and treatment started, the greater the chance that the child will acquire adequate language skills. Untreated problems are compounded by the time a child reaches the upper grades, making successful treatment more difficult. Older students may be less motivated because of repeated failure, adding another obstacle to the course of treatment. The time at which remediation is given also affects a dyslexic's chances. Often, remedial programs are offered only in the early grades even though they may be needed through high school and college. Remedial programs should be available as long as the student makes gains and is motivated to learn. Adults can make significant progress, too, although there are fewer programs for older students.

A dyslexic child's personality and motivation may influence the severity of the condition. Because success in reading is so vital to a child, dyslexia can affect his or her emotional adjustment. Repeated failure takes its toll. The child with dyslexia may react to repeated failure with anger, guilt, depression, resignation, and even total loss of hope and ambition; he or she may require counseling to overcome these emotional consequences of dyslexia. With help a dyslexic child can make gains but the assistance must be timely and thorough, dealing with everything that affects progress. For the child whose dyslexia is identified early, with supportive family and friends, with a strong self-image, and with a proper remedial program of sufficient length, the prognosis is good.

NICHD Research Support

The National Institute of Child Health and Human Development (NICHD) supports many studies designed to determine how most children learn to read and what may interfere with or prevent some children from acquiring this important skill. Some investigators are attempting to develop language tests that can predict which 5- or 6-year old

children have the necessary skills to learn to read and those who are at risk for reading failure. If these investigators are successful it is likely that many cases of dyslexia can be prevented. Other scientists are attempting to identify children at risk for dyslexia through the use of modern neurological examination procedures, including electroencephalography and PET scans (Positron Emission Tomography, an imaging technique that measures brain activity.)

Some scientists supported by the NICHD are studying the children from families that have a higher than normal incidence of dyslexia and related language disorders to deter-

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mine a possible genetic cause of the reading disorder. Other investigators are concentrating their research efforts on the development of specific descriptions of various subtypes of dyslexia with the hope that more appropriate therapies can then be planned.

Although a number of important advances have been made through research, many unanswered questions remain about this developmental disorder of childhood. Our ultimate goal is the complete prevention of dyslexia as well as other specific learning disabilities. Intermediate to that goal is the early identification of all children who are at risk for dyslexia so that prompt and appropriate procedures can be administered which will preclude the manifestation

of dyslexic symptoms, or minimize their effects on the child's intellectual, academic, psychological or social development.

Although impressive evidence exists concerning the specific behaviors and neurological characteristics of dyslexia, continued research is essential. Such medical and educational research along with sound diagnostic techniques and individually-designed educational programs can open the doors through which the dyslexic may enter into full participation in our literate society.

Other Sources of Information

The Orton Dyslexia Society, 8600 LaSalle Road, Suite 382, Chester Building, Baltimore, MD 21286-2044. Phone: (410) 296-0232

LDA (Learning Disabilities Association of America), 4156 Library Road, Pittsburgh, PA 15234. Phone: (412) 341-1515

CEC (The Council for Exceptional Children), 1920 Association Drive, Reston, VA 22091. Phone: (703) 620-3660

American Academy of Pediatrics, P.O. Box 927, 141 Northwest Point Boulevard, Elk Grove Village, IL 60009-0927. Phone (800) 433-9016 or (708) 228-5005

ASHA (American Speech-Language-Hearing Association), 10801 Rockville Pike, Rockville, MD 20852. Phone: (301) 897-5700

This fact sheet was published by the National Institute of Child Health and Human Development (NICHD), in cooperation with the Orton Dyslexia Society. For further information, contact any of the above organizations or write NICHD, P.O. Box 29111, Washington, D.C. 20040.

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